sories, one and one-half millions of dollars, has lent tragic emphasis to this point.

In 1888 the Director of the Geological Survey was authorized by Congress to examine the arid region with reference to reclamation of agricultural lands by irrigation. The initial appropriation of $100,000, which was raised to $250,000 in 1889, was discontinued for several years thereafter; but having been restored in part, it has been from time to time increased, and of the $100,000 appropriated for hydrographic work a large part is expended in ascertaining the service of streams, in surveying reservoir sites, and determining the possibilities and cost of flood water storage in the West.

During the present year a notable increase in hydrographic work is being made in the State of New York in co-operation with the office of the State Engineer and Surveyor. Streams tributary to the Mohawk and upper Hudson are being measured, the data having importance not only in water power development, but also in consideration of the quantity available for the deep waterway across the State. In the Southern Appalachian region the amount of water coming from the area which it is proposed to include within a National Park is being ascertained, this work being in addition to systematic measurement of streams entering the Atlantic Ocean, such for example as the Delaware, Susquehanna, Potomac, James and Savannah. Various important streams are also being measured along the head waters of the Ohio and Mississippi.

Through co-operation of the Hydrographic and Geologic branches, the investigation of artesian water conditions about Black Hills is being continued, and plans are under consideration for similar studies of southern California and of the southern coastal plain of the Atlantic and Gulf States.

Bailey Willis.

SECOND REPORT OF THE COMMITTEE OF THE GERMAN CHEMICAL SOCIETY ON ATOMIC WEIGHTS.

In 1897 a committee was appointed by the German Chemical Society to consider the subject of atomic weights with especial reference to securing uniformity for practical analytical work. As a matter of fact two distinct standards were in use, $H = 1$ and $O = 16$, and as the latest determinations of Morley had reduced the atomic weight of oxygen to 15.87 ($H = 1$) it made a decided difference in the atomic weights of the heavier elements which standard was used. This committee consisted of Landolt, Ostwald and Seubert, and to the surprise of many, their first report in November, 1898, was unanimous in favor of the standard $O = 16$. Up to this time Seubert himself had used and advocated $H = 1$ and the same was true of most German chemists. The two chief arguments for $O = 16$ are: (1) many of the atomic weights are determined with reference to oxygen or readily reduced to oxygen standard with little error, while reduction to hydrogen brings in a new and unnecessary error, and necessitates a recalculation and new table every time the hydrogen-oxygen ratio is corrected, as it has been several times in the past few years; (2) if $O = 16$ is taken, a large number of most frequently used atomic weights approximate very closely to whole numbers, simplifying calculations.

A second point advocated by the committee in the first report was that only so many figures should be given in the atomic weight of an element, as that the last figure should be correct within half a unit. In this report the suggestion was made of the desirability of international agreement, and a little later the society directed its committee to invite the co-operation of the chief scientific bodies of the world who might be specially interested in

chemistry. Favorable responses were made and twenty different committees appointed. There were from America two (American Chemical Society and American Academy of Arts and Sciences); Belgium, two; Germany, five; England, one; Holland, one; Japan, one; Italy, one; Austro-Hungary, four; Russia, one; Sweden, one; Switzerland, one. Denmark, France and Norway alone made no response to the overtures. Altogether there were fifty-six members of the international committee.

On December 15, 1899, a circular was addressed to these members asking for opinions upon three points:

1. Shall O = 16 be adopted as the standard of atomic weights?

2. To how many decimal places shall the atomic weights be given?

3. Is a smaller permanent committee on atomic weights desirable?

Forty-nine replies were received. As regards the standard, forty favored O = 16, seven H = 1, while Cannizzaro desired both, and Fresenius preferring O = 16 would be satisfied with either. It is interesting to note that six of the votes for H = 1 were German, six other Germans voting for O = 16. The only other vote for H = 1 was from Professor Mallet. Of the other Americans Richards, Gibbs, Remsen and Smith, voted for O = 16, while Clarke and Morley made no reply.

On the second point opinions differed so widely, that the committee was constrained to leave the decision to the smaller permanent international committee to be later appointed. Of the Americans, Richards, Gibbs and Remsen favor stating one figure which is uncertain by more than a unit, while Smith and Mallet would give only so many decimals that the last figure should be correct to less than half a unit.

Views were practically unanimous in favor of a small permanent committee and the committee recommended the appointment of a permanent committee of three chemists who have given special attention to the subject of atomic weights.

In conclusion the committee express a desire to receive the opinions of chemists outside of the international committee as to their preferences for the standard. Such replies should be sent before November 15th, to Professor Landolt, Berlin, N. W. Bunsenstrasse, 1.

In this connection it is interesting to note that the work of this committee is the final outcome of an agitation which was begun in this country in 1889 by Dr. F. P. Venable in a paper published in the *Journal of Analytical Chemistry* (3: 48), and which was taken up the following year by Dr. Brauner, of Prague, and very warmly discussed before the German Chemical Society by Ostwald, V. Meyer, Seubert and Brauner. At that time Meyer and Seubert advocated H = 1 for the standard and this view has had many supporters in Germany but few elsewhere. The argument in its favor seems to be the impossibility from a didactic standpoint of taking *sixteen* as a *unit*. In his first paper Venable pointed out clearly the distinction between the idea of *standard* and *unit*, showing that a standard need not be a unit, and this view has been generally adopted by most chemists outside of Germany.

J. L. H.

THE FOSSIL SHELLS OF THE LOS ANGELES TUNNEL CLAYS.

THE detection of a species of *Radiolites*, by Mr. Homer Hamlin, in the clays perforated in the course of drifting the Third Street tunnel in the city of Los Angeles is a discovery of noteworthy importance by reason of its bearing upon the question of the geologic age of the region hereabout. These clays, which will be more fully described by Mr. Hamlin or myself when the tunnel excavation is completed, have